WIDE SCOPE OF WORK DONE BY SUGAR PLANTERS' ASSOCIATION IS SHOWN BY THE COMPREHENSIVE REPORTS OF ITS SEVERAL COMMITTEES

Reports covering practically the entire field of sugar production, shipment and marketing have been filed by the different committees of the Sugar Planters' Association, and many of them are of great interest to the people of Honolulu.

Report of the committee in charge of the experimental station reads in part as follows:

Those of you who remember the modest beginnings of the station when Dr. Walter Maxwell was appointed to the directorship in the year 1895, and can today see the establishment in Makiki with its substantial and fully equipped buildings, its library and scientific apparatus, and its staff of between 20 and 30 scientists, many of whom are of world-wide celebrity, and whose bulletins and publications are studied and valued by the scientific world at large, may well feel proud of the way our association has kept abreast of scientific development and discovery in every department.

But to appreciate fully the immense increase that has recently taken place in the operations of the station, it is necessary to visit the sub-station at Waipio on the plantation of the Oahu Sugar Company, where are being conducted, not on the small scale that has hitherto been of necessity imposed on us, but on a complete plantation scale, so that the results obtained from these experiments may be not only absolutely reliable, but may also be directly applied to general plantation conditions.

In addition to this a visit to the Ewa Plantation Company's factory would show a complete installation for carrying out the investigations and experiments in connection with the Battelle process which were conducted during the past year, and which it is planned to continue into the coming season.

FIGHTING CANE PESTS

Besides the obvious evidences of the work that is being done by the scientists at the station, there is equally important though less visible work being carried on continually. Apart from such routine work as sampling and testing fertilizers, soils, etc., breeding and trying out new cane varieties, making efficiency tests in the mills, reporting on diseased canes, examining specimens and so forth, the breeding of colonies of parasites and the distributing of them to the plantations which are infected with pests has been continued by the entomologists until these pests have become very generally distributed throughout the territory. We look forward confidently to the time when, not long hence, the damage done to our crops by these pests will be as comparatively unimportant as that done by the leaf hopper today; a new pest, the Anomala Orientalis, has made its appearance here and is being closely watched by the entomologists; most promising experiments are being conducted with Hawaiian seeding canes; fungus and other cane diseases are being carefully studied; in fact the magnitude of the work being carried on by the station in its various departments has reached dimensions little dreamt of a few years ago. While this development in every direction is necessarily accompanied by a corresponding increase in the annual cost of carrying on the work of the station, the results already achieved have been of such inestimable value to the sugar industry here, and the continuation of the investigations and scientific control of our fields and factories is of such enormous advantage to every plantation manager in these islands, that there is hardly room for two opinions regarding the absolute necessity of continuing to conduct the experimental station along the progressive lines that are now being followed.

FISHER INVESTIGATION

During the investigation recently conducted here by the Secretary of the Interior, into the complaints and charges made by the Delegate against the Governor, many subjects were touched on or examined into which could hardly be considered exactly germane to the original matter to be investigated. Amongst these was the experimental station of the Planters' Association. Inasmuch as this institution is in no way connected with the Government, but is owned and supported entirely by the members of the association for their own advantage and use, it might have been supposed that the methods of conducting that institution were hardly a subject for a Government investigation, and that provided those methods did not in any way conflict with the law of the land, any public criticism thereof should come from members of the association and be presented by them to those responsible for and in charge of the institution. As, however, charges of undue secrecy and improper procedure in the conduct of the affairs of the experimental station were publicly made during the course of the investigation, and as no opportunity was afforded to the association of replying to or defending itself from the criticisms thus levelled against it, your committee decided that its wisest course would be to request the director of the experimental station to address a letter to Mr. Fisher in an endeavor to correct the false impression which these public misstatements must inevitably have made upon his mind.

ANOMALA BEETLE

When the existence of this pest was first brought to the attention of the entomologists, it was hoped that the damage it might do would prove to be negligible and that no alarm need be felt about it. Owing, however, to recent developments, Mr. Muir has made a special report on the situation which has been published in the Planters' Record for November. Your committee hopes that every manager who has not already done so will read this report carefully, and will be on the alert for any manifestations of the presence of this pest in his fields.

BATTELLE PROCESS

The results of the preliminary tests and experiments made last season in the Ewa Plantation Company's factory were considered sufficiently encouraging to justify a continuation of the same during a portion of the coming grinding season. While it is too early to venture upon any prophesies regarding the eventual outcome of these experiments, it is safe to say that they are being followed with the closest interest, and if successful, will have far-reaching effects on the whole sugar industry of these islands.

DIRECTOR'S REPORT

Following is the report of Director of the Experiment Station:

Gentlemen:—I herewith present a report covering the work of the Experiment Station of the Hawaiian Sugar Planter's Association for the fiscal year ending September 30, 1912.

The most important entomological work of the year has been in connection with the rearing and distribution of colonies of this parasite and in making investigations to determine the extent to which it has become established and spread on the plantations. In all, 39 colonies were sent out, of which 21 were reared in the Station breeding cages under the care of Mr. Kershaw, and 18 were supplied from material collected by Mr. Swezey in the fields of the Waialua Agricultural Co. Through the courtesy of the plantation company in question, it will be seen that the work of distribution was facilitated in such degree as to prove of very material advantage to nearly one-half of the H. S. P. A. plantations. The Waialua fields from which colonies for shipment were to be derived were chiefly those which were being harvested or were about to be harvested at the time.

PEST WIDESPREAD

In the majority of these cases the tachinids have spread to all parts of the plantation where the cane is attacked by borers. On the remaining plantations colonies of the parasite have not been present for a long enough period for them to have increased sufficient to be readily found. On some of the plantations examined, Mr. Swezey reports, that owing to the scarcity of "borered" cane, the presence of the parasite was determined with great difficulty and it is not unlikely that in a number of instances the borers have not been sufficiently numerous to give the parasite a fair start.

Investigations conducted on some of the plantations where the parasite was first established show that a large percentage of the borer grubs are parasitized. In one instance where an accurate count was made of the grubs found, 50 per cent were affected; if these had been left undisturbed in the field some that were not already parasitized would have become so, thus making the actual parasitization in the field somewhat over 50 per cent.

In the crop of cane harvested in 1912, several of the plantation managers have observed a satisfactory decrease in the amount of cane destroyed by the borer, and future crops will without doubt show an increase in beneficial results from the parasite. As shown by the field observations of the Station entomologists on plantations where the Tachinid has become spread throughout, a strong point in the efficiency of the parasite lies in the fact that it migrates to fields of young cane as soon as borer-injured cane can be found. In many such fields examined nearly all of the borer grubs were found to be parasitized. The killing off of these first grubs in the cane should very materially check the increase of the borer at the start and prevent the cane from becoming badly infested.

NEW CANE PEST

During the summer a new cane pest, Anomala orientalis (from Japan), was identified by Mr. F. Muir from a quantity of grubs collected by Mr. A. T. Speare in an affected patch of cane on one of the Oahu plantations, Mr. Speare's attention having been drawn to the grubs in question during one of his regular pathological inspections. Its habits are somewhat similar to those of the "cane grub" in Australia, in that the larvae or grubs feed in the stools, eating off the roots, boring into the base of the stalks, and also destroying the eyes. It occurs at present in one local region and in patches of from a few square yards to a few acres in extent, and in sufficient numbers to cause a dying out of the cane. It is likely that the Anomala beetle has been established in this locality for several years, since a few similar grubs had been found previously in connection with patches of cane in a similar condition. It was supposed in those instances that the grubs were those of the common Japanese rose beetle, as more or less of the latter are usually to be found in the soil in cane fields, and the larvae of these two species resemble one another very closely. On careful examination, Mr. Muir has discovered certain minute structural characters by which they may be readily distinguished, with the aid of a pocket lens, and fortunately there need be no further confusion as regards the identity of the grubs in question.

Some progress has been made in the study of this pest, but the feeding habits of the adult beetles remain yet to be ascertained. In this they differ from the Japanese rose beetle, which feed so extensively on the foliage of many kinds of plants. A bacterial disease has been found, by Mr. Muir, to be killing many of the grubs. It may be that this disease has been active in keeping the pest in check heretofore and that the past season has not been so favorable for the propagation of the responsible bacteria, thus allowing the grubs to increase to an unusual extent.

Some search has failed to find this pest in any other district of the Islands. Enough is not known yet concerning it to permit the entomologists to venture an opinion as to whether it is likely to spread and become a serious pest; but it will need close watching and any circumstances tending to indicate its presence elsewhere in the Islands should be promptly investigated.

HORNFLY PARASITES

As in the three previous years the entomological staff has had the handling of the hornfly parasite material sent from Europe by Mr. Koebele. A considerable number of shipments of small lots of this material were received during the year just closed, but mostly during October and November, 1911. While a few parasities were successfully bred, the numbers emerging at any one time were so small as to offer but small chance of accomplishing anything with them. They were chiefly a Cynipid fly of the genus Figites. They failed to breed in the cages prepared for this purpose and although a few were liberated at different times in the best available places, Mr. Swezey is of the opinion that the prospects of their becoming established are not encouraging.

The favorable season for sending these parasites from Europe is now at hand again and the entomologists are beginning to receive, at this writing additional small shipments of the same parasite. It is to be hoped that the results from these new consignments will be more satisfactory.

PATHOLOGICAL WORK

The research work in cane pathology has been conducted along the lines indicated in the report of last year, and articles based on orignal work have appeared from time to time in the Planters' Record showing the progress being made.

Dr. Lyon has completed his studies of the iliau fungus and the results of this very important investigation have been published in bulletin form. He has devoted all available time to the study of Yellow Stripe disease, Fiji disease, and Sereh. Certain symptoms or pathological prenomena common to all three of these diseases have been noted by Dr. Lyon and he is convinced that a complete understanding of the causes responsible for any one of them will undoubtedly aid considerably in determining the etiology of the others. For this reason he is working on all three, although a knowledge of Yellow Stripe disease is the chief end aimed at. The careful comparisons of diseased and healthy canes which the pathologists have been able to make at the Experiment Station clearly show that this disease can, and will, cause very serious losses if allowed to spread on the plantations. It is now well established on Hawaii, Maui and Oahu, and constant attention will be required to keep it under control. Sereh has been found in Hawaiian fields, but as our climatic conditions are not congenial to its development, Dr. Lyon feels that little fear need be entertained that it will ever become epidemic, providing that it is not encouraged too much by the growing of susceptible varieties.

Fiji disease has not yet found its way to the islands and the strictest quarantine against this malady must be constantly and most vigilantly enforced.

Mr. Larsen has continued his study of the spot-disease of cane leaves, bringing to light many new and important facts concerning the habits and life-histories of the parasites which cause them. He has cultivated a great many fungi and tested out their parasitism by innoculation experiments. Three distinct strains of the eye spot fungus "Corcospora sacchari) have been isolated, one of which proves to be far more virulent than the others.

Mr. Speare has devoted his time to the study of fungi parasitic on sugar cane insects. He has had six under observation and has worked out in great detail the life cycle and parasitic habits of three; two of which are species new to science. A lack of material has not permitted him to experiment with the others to any extent.

All of the plantations on Kauai, Maui, and Oahu have been inspected by Messrs. Larsen and Speare during the year and a detailed report on the prevalence of cane diseases on each has been returned.

All specimens of diseased canes submitted to the experiment station for examination have received prompt and careful attention at the hands of Dr. Lyon and his staff. The pathologists have been asked from time to time to determine the cause of diseases affecting plants other than cane and in complying with these requests they have found it necessary to make cultural studies of diseased tissue from the following plants: alfa, alligator pear, banana, ca tion, eucalyptus, geranium, ma pepper, sweet potato and taro. T have also made diagnosis by mi scopic examination of diseases cotton, date palm, orange, pe pineapple, rose and vanilla.

The diseases of banana and euca tus appear to be of more than o nary economic importance. pathologists began the study of banana disease at the request of E. V. Wilcox, of the U. S. Experim Station, who feared that the Panama disease. D lated several organisms eased plants and was of trying inoculation with them when, owing to the exis cies of the mosquito campaign, became suddenly deprived of the nana plants as working material. was able to say with certainty, ever, that the specimens submit by Dr. Wilcox were not afflicted Panama disease, as the organi known to be responsible for this ady were not present in their sues. From the nature of the or isms which were found Dr. L thinks it likely that the disease the so-called "Moko disease" of West Indies.

The eucalyptus disease is op ing in the grove on Tantalus, w a great many trees have died during the last four years. Mr. sen has isolated a fungus from fected trees which behaves as an gressive parasite when brought contact with the tissues of a hea tree. Since the eucalypti are chief trees with which the Bureau Agriculture and Forestry is str to replenish our depleted forests, trouble merits prompt and careful tention.

CHEMISTRY AND SUGAR TECHNOLOG

The Behavior of Cane Pressure.—In planning Mr. Deerr felt that informati value in mill work could be obta by studying the behavior of fiber under great pressures, espec ly as the literature of the cane su industry contained no reference an experimental study of this nat

As the station possessed no ting machines, two belonging to College of Hawaii were placed at disposal through the kindness of Gilmore and Dr. Young. Some cial pieces of apparatus were constructed locally.

As a result of many experime Mr. Deerr found that the quantity juice expressed from chopped crushed cane depends on:

(a) The actual pressure emplo

(b) The number of pressings, dependent of the actual pressure ployed.

(c) The degree of fineness of material pressed.

As regards the above, it was fo that after a certain pressure

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